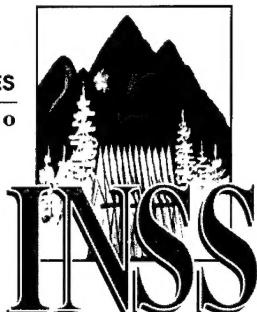


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**INSTITUTE FOR NATIONAL SECURITY STUDIES**  
**U.S. Air Force Academy, Colorado**



## **Russia's Crumbling Tactical Nuclear Weapons Complex: An Opportunity for Arms Control**

Stephen P. Lambert  
and  
David A. Miller

April 1997

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## **FOREWORD**

We are pleased to publish this twelfth volume in the *Occasional Paper* series of the US Air Force Institute for National Security Studies (INSS). This monograph represents the results of research conducted during fiscal year 1996 under the sponsorship of a grant from INSS.

This paper presents a novel response to the many security challenges posed by Russian perceptions of the continuing utility of their non-strategic nuclear forces and the related problem of “loose nucs” within the Russian Federation. The authors develop an air-delivered nuclear forces arms control regime and argue that eliminating this class of weapons would be one of the best ways to address these challenges. As the authors point out, despite its many benefits, such a regime would potentially face strong opposition due to its broad sweep, as well as issues such as the requirement for the United States to eliminate the airbreathing leg of the triad. Significantly, the authors bolster the case for the political acceptability of such a regime by uncovering evidence that the Soviets were considering advancing a similar proposal in 1991. However, the Soviet proposal was overtaken by the August 1991 *coup* attempt and President George Bush’s unilateral nuclear initiatives that September.

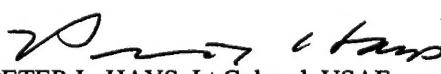
Many readers will no doubt disagree with this proposal and its implications for the US nuclear triad. Nonetheless, the authors’ suggestions deserve careful scrutiny because they refocus attention on non-strategic nuclear forces—arguably the largest and most dangerous dimension of the post-Cold War nuclear overhang. In that regard, this paper serves as a logical successor to the discussion in *INSS Occasional Paper 10* on the dangers of criminality and weapons proliferation in Russia. INSS is pleased to offer Lambert and Miller’s fresh ideas for public debate.

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### *About the Institute*

INSS is primarily sponsored by the National Security Policy Division, Nuclear and Counterproliferation Directorate, Headquarters US Air Force (USAF/XONP) and the Dean of the Faculty, US Air Force Academy. Our other sponsors currently include: the Air Staff's Intelligence, Surveillance, and Reconnaissance Directorate (XOI); OSD Net Assessment; the Defense Special Weapons Agency; the Army Environmental Policy Institute; Army Space Command; and the On-Site Inspection Agency. INSS' mission is to promote national security research for the Department of Defense within the military academic community, and to support the Air Force national security education program. Our research focuses on the areas of greatest interest to our sponsors: international security policy (especially arms control and counterproliferation), Air Force planning issues, regional security policy, conflict in the information age (including the revolution in military affairs and information warfare), environmental security, and space policy.

INSS coordinates and focuses outside thinking in various disciplines and across services to develop new ideas for defense policy making. The Institute develops topics, selects researchers from within the military academic community, and administers sponsored research. It also hosts conferences and workshops which facilitate the dissemination of information to a wide range of private and government organizations. INSS is in its fifth year of providing valuable, cost-effective research to meet the needs of our sponsors. We appreciate your continued interest in INSS and its research products.



PETER L. HAYS, Lt Colonel, USAF  
Director, USAF Institute for National Security Studies

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## **EXECUTIVE SUMMARY**

As politicians and policy makers trumpet the successes of strategic reductions and the achievements of the START agreements, Russia has increasingly focused on a rhetorical and doctrinal campaign to enhance the credibility of nuclear war-fighting threats by legitimizing theater or tactical nuclear systems. There is one certainty about the state of Russian nuclear weapons, both strategic and non-strategic: the Russian Federation is convinced that, ultimately, its security rests upon these weapons, and it has therefore attempted to shield both the personnel and the hardware from the effects of the military rollback. In addition, because Russian military planners appreciate the political deterrent value of nuclear weapons as well as their war-fighting applications, the military and scientific elite continues to invest in their operational future. Yet there seems to be substantial opportunity for security breaches, theft, and system compromise in the nuclear weapons complex of the Russian Federation today.

While the motives of strategic arms control advocates may be admirable, the notion that the two largest possessors of nuclear weapons could speedily draw down their arsenals to under 2000 warheads, as a START III regime suggests, is misguided. Such an idea highlights a bias toward the apex of the nuclear weapons pyramid—the strategic nuclear forces—and ignores the thousands of so-called tactical nuclear weapons possessed by both states. The very real threats associated with Russia’s tactical nuclear arsenal—possible operational use, loss of central control, and the theft or diversion of intact nuclear weapons—should impel those with genuine concerns to redirect their efforts toward the lower end of the nuclear weapons spectrum. Unlike strategic systems which have been the subject of years of negotiations, treaties, and transparency regimes, these tactical systems have been largely ignored by both

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the official as well as the activist community. However, while one can envision the US and Russia making further reductions to existing strategic arsenals, deep cuts in tactical systems would require a major redirection in current arms control efforts.

The arms control proposal presented in this paper incorporates a regime that would address this much larger and potentially more dangerous class of weapons. A regime calling for the elimination of air-delivered tactical nuclear weapons may prove to be a useful model for reinvigorating the stalled process of nuclear arms reductions, while simultaneously promoting US, European, and Russian national security interests. Because this would create a global ban on air delivered nuclear weapons, it would also eliminate one leg of the US strategic nuclear triad, and American bombers could convert to a strictly conventional role. This proposal, while controversial, is not strictly original; indeed, the Soviet Union had a similar proposal ready for delivery to the United States in 1991, but the effort was overtaken by President Bush's unilateral tactical nuclear reductions that fall. The authors here present details from that Soviet proposal for the first time.

There are many good reasons why the United States should move toward a smaller nuclear force posture. This means reducing nuclear weapons in general, and Russian air-delivered nuclear weapons in particular. It is in the security interests of the democracies of Europe and North America to address concerns regarding the nuclear weapons program of the Russian Federation. While US nonstrategic nuclear forces still have a role in Europe today, their perceived value and utility are gradually fading, at least in the eyes of some observers. In fact, their final utility may be their role as bargaining chips to induce the Russian Federation to eliminate entirely this category of weapons.

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*Russia's Crumbling Tactical Nuclear Weapons Complex:  
An Opportunity for Arms Control*

*The problems of victory are more agreeable than the problems  
of defeat, but they are no less difficult.*

— Winston Churchill

The United States and Europe are at a crossroads. Despite the apparent reduction in East-West tensions brought about by the collapse of the Soviet Empire, the strategic calculus of NATO and the former Warsaw Pact countries remains unclear. Traditional Cold War arms control efforts between the United States and the former Soviet Union are at an impasse, in large part due to Russia's determined resistance to the planned enlargement of the Atlantic Alliance. The March 1997 Helsinki Clinton-Yeltsin summit symbolized, to a large degree, the ambivalence in nuclear arms control. Both sides opted to focus their discussions on further reductions in their strategic arsenals, characterizing their initiatives to "slash strategic nuclear missiles to a ceiling of 2,500 warheads each by [the year] 2007" as grand and far-reaching. Meanwhile, Russia threatens to abrogate its 1991 unilateral initiative to withdraw all, and destroy most of, its tactical nuclear arsenal. In essence, both countries have resorted to a stale and safe approach, discussing strategic reductions while steadfastly avoiding the looming problems presented by Russia's crumbling nuclear weapons complex as a whole—specifically the troubling developments in its extensive tactical nuclear arsenal.

However, perpetual avoidance of the real problems within Russia's tactical nuclear arsenal is not limited to government officials. In a public statement released on December 4th, 1996, two retired US military officers, General Lee Butler, former commander of US strategic nuclear forces, and General Andrew Goodpastor, former commander of NATO forces in Europe, called for the United States and the Russian Federation to take concrete steps

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toward the *global abolition* of nuclear weapons. In a surprising turn of events, General Butler expressed his apparently new-found belief that “nuclear weapons have no defensible role...[and] that broader consequences of their employment transcend any military utility.”<sup>1</sup> The following day, a group of 61 retired generals and admirals from 17 countries joined in issuing a statement calling for:

- significant cuts in current nuclear stockpiles by all nations that currently possess nuclear weapons;
- the removal of nuclear weapons from alert postures and substantial reductions in their readiness;
- a long-term international policy “based on the principle of continuous, complete and irrevocable elimination of nuclear weapons.”<sup>2</sup>

Among this group’s recommendations was a call for the United States and Russia to continue the START process, and, as soon as practicable, to “cut down to 1000 to 1500 warheads each and possibly lower.”<sup>3</sup> In the judgment of these former military officers, such a move could be taken quickly and without any reduction in the military security of either the US or Russia.

While the motives of this group may be admirable, the notion that the two largest possessors of nuclear weapons could speedily draw down their arsenals to under 2000 warheads is misguided. Such an idea highlights a bias toward the apex of the nuclear weapons pyramid—the strategic nuclear forces—and ignores the thousands of so-called tactical nuclear weapons possessed by both states. The very real threats associated with Russia’s tactical nuclear arsenal—possible operational use, loss of central control, and the theft or diversion of intact nuclear weapons—should impel those with genuine concerns to redirect their efforts toward the lower end of the nuclear weapons spectrum. Unlike strategic systems which have been the subject of years of negotiations, treaties, and transparency regimes, these tactical systems have been largely ignored by both the official as well as the activist community.<sup>4</sup> However, while one could envision the US and Russia making further reductions to existing

strategic arsenals, deep cuts in tactical systems would require a major redirection in current arms control efforts.

Regardless of how daunting such a task may seem, grave doctrinal as well as safety and security concerns regarding Russia's tactical nuclear arsenal make it imperative that steps finally be taken toward real, verifiable cuts in tactical warheads. This proposal incorporates an arms control regime that would address this much larger and potentially more dangerous class of weapons. A regime calling for the elimination of air-delivered tactical nuclear weapons, which we propose, may prove to be a useful model for reinvigorating the stalled process of nuclear arms reductions, while simultaneously promoting US, European, and Russian national security interests.

### **A View from the West**

**Current Nuclear Policies.** The present US administration openly reaffirmed a reduced, but nonetheless robust, nuclear posture in the 1994 Nuclear Posture Review (NPR).<sup>5</sup> Since then, however, US policy makers have largely avoided public discussions involving nuclear weapons. In the United States as well as most NATO European countries, officials have eschewed nuclear weapons issues out of concern that acrimonious debates could result from public discussion of nuclear weapons or deterrence as a whole. Additionally, as a consequence of the end of the Cold War and efforts to build new political relationships with former adversaries, what had been the Alliance's primary function—collective (nuclear) defense—is being de-emphasized. NATO's nuclear weapons are increasingly portrayed as serving “all azimuths” functions, yet their enduring relevance is not as clear as during the Cold War. Instead of emphasizing the Article 5 commitment in the North Atlantic Treaty<sup>6</sup>, NATO is moving toward a strategy of selective engagement, whereby Alliance members will opt in or out of future operations (e.g., peacekeeping and humanitarian relief) based on their own

national interests. In some ways this may seem inevitable as the Alliance adapts to the new international environment.

**Nuclear Disarmament Efforts.** Traditionally, Western attention on nuclear disarmament has focused primarily on intercontinental, strategic weapons. This focus stems, at least in part, from a long-term trend in arms control policy. The United States, which has been beyond the immediate reach of Soviet and Russian tactical nuclear weapons, has historically sought to gain limitations and reductions in Russian strategic systems. However, as nuclear expert Bruce Blair explains, “the risk [of nuclear employment] is being unintentionally driven up by a deep-seated bias in US arms control strategy. The American obsession with Soviet counterforce capabilities resulted in the reduction of the forces that happened to have the strongest safeguards (the silo-based missiles) and in greater Russian reliance on weapons with relatively weak safeguards,” especially air-delivered, theater-based nuclear weapons.<sup>7</sup>

Ironically, as politicians and policy makers trumpet the successes of strategic reductions and the achievements of the START agreements, Russia has increasingly focused on a rhetorical and doctrinal campaign to enhance the credibility of nuclear warfighting threats by legitimizing theater or tactical nuclear systems. Most would agree that while all-out strategic nuclear war is unlikely to occur, the employment of theater or tactical nuclear weapons is a much more plausible and, according to some (especially in Russia), legitimate solution to certain military dilemmas. Ivo Daalder addresses the heart of the problem when he writes that an arms control focus on long-range, land-based missiles eventually created a new gray area problem concerning nuclear weapons systems, because air- and sea-based theater or tactical nuclear weapons were excluded from prior negotiations.<sup>8</sup> In a recent demonstration of this continual strategic focus, at the March 1997 Helsinki summit President Clinton attempted to jump-start the arms control process with “START III,” proposing further Russian and American

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reductions to 2000-2500 strategic warheads by the year 2007.<sup>9</sup> Nevertheless, experts agree that nuclear arms control will remain stalled as the Russian Duma continues to hold START II hostage to the anticipated enlargement of the Western Alliance.

### **The View Toward Russia: Tactical Nuclear Weapons Issues and Problems**

The Russian Federation continues to place great value on nuclear weapons both in terms of their war-fighting potential as well as political weapons for strategic deterrence. Russian national security planners see their country surrounded by significant risks in a political atmosphere of ambiguity and fluidity. Moscow therefore will continue to anchor its national security in nuclear weapons as the ultimate guarantee of Russia's survival. Russian military doctrine prescribes a strong role for nuclear deterrence and affirms its value in the world today. As Konstantin Sorokin, an expert on these matters states, this "official position in support of Russia's maintaining its nuclear status is unlikely to change much with time, whatever the internal political shifts." Russia presently views itself as being in a transitional period and therefore must avoid "irrevocable marginalization in the world community."<sup>10</sup> Nuclear weapons help Russia avoid marginalization because they recall Russia's former superpower status and convey a much stronger "hands-off" message than do conventional weapons.

Tactical nuclear weapons occupy a noteworthy position within Russia's nuclear posture. During the Cold War, the Soviet Union widely deployed and dispersed its tactical nuclear weapons in order to guard against preemptive strikes and to ensure their survival in the event of hostilities. This operational philosophy was complemented by a high level of pre-delegation with respect to launch authority and local weapons control. In essence, the Soviet tactical nuclear weapons posture reflected a nuclear-warfighting doctrine. The likelihood of their

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employment during war was quite high. Today these weapons remain an integral part of the Russian arsenal, and the Soviet employment doctrine remains in place. In the event of a crisis or hostilities, tactical nuclear weapons are probably the least-controlled element of the Russian nuclear arsenal—and the ones most likely to be employed.

Disturbingly, the security management of these weapons does not meet NATO standards. Indeed, a recently leaked CIA analysis entitled “Prospects for Unsanctioned Use of Russian Nuclear Weapons” reportedly concluded that the “Russian nuclear command and control system is being subjected to stresses it was not designed to withstand as a result of wrenching social change, economic hardship, and malaise within the armed forces.”<sup>11</sup> According to published accounts of the report, Russian controls over tactical nuclear arms are poor. The report placed these weapons in the highest risk category for unsanctioned use or sabotage. It is widely recognized that the Russian nuclear weapons and fissile materials infrastructure has been under unprecedented stress since the collapse of the Soviet Union.<sup>12</sup> In this regard, the threat of proliferation or leakage from tactical nuclear weapons is particularly acute. Major General Belous, the head of the Military Policy Section of the Center for Scientific Research in Moscow, points out that “tactical nuclear weapons are especially vulnerable due to the fact that they are numerous, relatively compact, and widely distributed.”<sup>13</sup>

In general terms, a modern and capable nuclear safeguard system consists of four basic and important elements. A *physical protection program* is designed to deter and repel the forcible intrusion into nuclear facilities. A *material control and accountancy system* is designed to protect nuclear weapons from removal by insiders as well as to monitor movement of warheads and control inventories. A *human reliability program* ensures that those personnel that have access to facilities are properly vetted and controlled. Finally, an *integrated national system* includes a centralized support system with regulatory oversight and a national computerized data base used for tracking purposes.<sup>14</sup> The Russian

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nuclear infrastructure suffers deficiencies in all of these categories. The threat of operational use, loss of control, or leakage of tactical nuclear weapons in Russia is multi-faceted and can be divided into five general areas:

- Physical and technical security
- The doctrine of pre-delegation
- Nuclear dependency in the face of certain military contingencies
- Stockpile consolidation and stewardship efforts
- Personnel and internal security problems

**Physical and Technical Security.** Normally tactical weapons are kept in specially designed storage depots separate from their delivery systems.<sup>15</sup>

According to Russian expert Oleg Bukharin, “The depots, usually underground bunkers, are located inside heavily guarded exclusion areas, surrounded by several layers of engineering barriers and equipped with access control systems.”<sup>16</sup> While these *physical* security methods seem to be quite normal, it is not readily apparent how they were designed to operate. The Soviet weapons security system was intended to thwart an attack by NATO’s special operations forces on the eve of a Third World War. The system relied mostly on the strength of the physical barriers (guard fences, barbed wire, etc.). Today, as in the past, Russian tactical nuclear weapons facilities make minimal use of electronic protection and surveillance systems.<sup>17</sup> In other words, the security system is oriented toward external attack and is based on the strength of the protecting force and the robustness of the physical barriers in place. As one expert explains, “under these circumstances, [and without the presence of an electronic monitoring and accountability system] a principal risk of diversion is a corrupted insider (or group of insiders) in the security force.”<sup>18</sup> In his testimony before the US Senate on March 20, 1996, John Deutch, then Director of the Central Intelligence Agency, indicated that “a knowledgeable Russian has told us that, in his opinion,

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accounting procedures are so inadequate that an officer with access could remove a warhead, replace it with a readily available training dummy, and authorities might not discover the switch for as long as six months.”<sup>19</sup>

The size and relative simplicity of tactical nuclear weapons make them easier to use, as well. Bukharin points out that, “tactical weapons...are easy to hide and transport and, under certain circumstances, are directly usable. Indeed, although tactical weapons are protected by mechanical locks and special equipment is required to use them, a state, or even a group of terrorists, can overcome such difficulties given time and resources.”<sup>20</sup> Experts familiar with Russian locks on tactical systems indicate that the technical safeguards found on gravity bombs and cruise missiles deployed with Russian bomber divisions are the weakest. Locks on the gravity bombs are not sophisticated, and cruise missiles lack adequate technical protection to inhibit unauthorized use. In fact, Russian sources indicate that a captured cruise missile armed with a nuclear warhead could readily be launched from a variety of aircraft and would produce a nuclear detonation.<sup>21</sup>

Indeed, an acknowledged expert in Russian nuclear weapons control indicates that the blocking devices are really “just gimmicks designed to buy time.” In all probability, the Russian ministries in charge of nuclear weapons are still relying on old Soviet security methods. According to Bruce Blair, “in the event of a serious breach of safeguards in the field, the Russian military establishment would need to promptly dispatch personnel to suppress the disobedience and restore physical control.” Moreover, “if social and political circumstances weaken the cohesion of the military, then its ability to deal with such violations would obviously be diminished.”<sup>22</sup> As a matter of comparison, the 1994 Nuclear Posture Review in the United States mandated that all US nuclear weapons have Permissive Action Links (PALs) installed on them by 1996.<sup>23</sup> Essentially, this meant that even if an intruder was able to breach the physical and electronic security of a US nuclear facility, the weapon would either disable itself

or not function. In Russia this level of protection is limited to Russian strategic systems. Western estimates indicate that only about 45 percent to 65 percent of Russian systems are equipped with PALs and that Russian tactical weapons lack this type of modern security feature.<sup>24</sup>

**Pre-Delegation and the Doctrine of De-Escalation.** One of the concerns cited by officials involved in nuclear weapons control issues relates to the doctrine of pre-delegation. This policy has its roots in Cold War-era Soviet weapons control strategies and is tied to long-standing Soviet practices of maintaining vast and dispersed nuclear forces in launch-ready configuration.<sup>25</sup> The danger involved with maintaining this type of rapid reaction posture is that nuclear missiles could very well be fired on the basis of a false warning. And as Blair indicates, “the breakup of the former Soviet Union increased this risk by politically dismembering the missile attack early-warning network.”<sup>26</sup>

Even though Russia still operates under a launch-on-warning concept,<sup>27</sup> the control mechanisms for its *strategic* systems are relatively secure. The operational philosophy of pre-delegation nonetheless extends to Russia’s *tactical* weapons. In order to increase the survivability of the tactical nuclear systems (which are more widely dispersed and suffer from a shortage of communications links), launch authorization codes are pre-delegated to local commanders during times of increased tension. Thus, the potential for local use is significantly increased during times of conflict.

To compensate for Russia’s current conventional weakness, Russian strategists have explicitly sought to “extend the threshold for escalation downward,”<sup>28</sup> thereby increasing the likelihood of tactical nuclear release in the face of hostilities. Thus there are two distinct concepts at work: (1) the procedure of pre-delegating the launch codes; and (2) the operational doctrine of lowering the nuclear threshold. These trends are corroborated by interviews with Russian officials familiar with nuclear weapons strategies. Dr. Nikolai Sokov, an expert

on the Soviet delegation to START I as well as other US-Soviet summit meetings, affirms that with such a doctrine in place, one “cannot rule out that a local commander could individually take the authority to launch a weapon.”<sup>29</sup>

The assumption that the Russian weapons control system is more stable during peace-time is also suspect. Due to the lack of technical safeguards, especially on air-delivered weapons (cruise missiles and gravity bombs), individual attempts to acquire these weapons even during times of peace are possible. Moreover, the lack of adequate locking mechanisms on these weapons would then make them deliverable, with a full nuclear yield, even without launch authorization.

Media attention has been overwhelmingly dedicated to the apex of the control system; this focus seems to be at least partially misplaced. While it is largely true that the absence of a stable political system and the reliance on a control system with the potential for sudden shifts in allegiances could cause a breakdown of control, the most important dangers of misuse of Russia’s nuclear weapons are not to be found at the apex, but at the lower echelons of the command system. The Russian practice of pre-delegation carries with it the dangers of a premature weapons release or the employment of a nuclear weapon because of the judgment of a local military commander.

#### **Nuclear Dependency in the Face of Conventional Contingencies.**

Concerns regarding Russia’s nuclear policies have been deepened by Russia’s increasing reliance on its nuclear forces in the face of dramatically reduced conventional force quality and readiness. Igor Khripunov, a former Soviet diplomat and expert on security affairs, recently noted that some Russian military analysts “make a strong case for maintaining and improving nuclear weapons, *air-based weapons in particular*, without which Russia cannot adequately protect its security in the current geostrategic situation.”<sup>30</sup> It seems to be clear that “the demise of the Red Army that formerly protected Russia shifted the burden of

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security onto nuclear forces. Russia's new military doctrine abandons its former pledge of no-first-use of nuclear arms, and widens the conditions under which it might use them. By increasing its reliance on these weapons, Russia also magnifies the significance of its nuclear strategy.”<sup>31</sup>

In order to operationalize this new reliance on nuclear weapons, Russian officials have chosen to emphasize the value and role of tactical nuclear weapons. They understand that posturing with strategic nuclear systems is practically useless, since they perceive there is a very basic state of strategic equilibrium between the United States, Russia, and China. Therefore, the solution to making the nuclear threat more credible is to articulate a greater role for tactical nuclear weapons since these weapons are viewed as “warfighting weapons.” In fact, there has been evidence that some Russian officials have not ruled out redeploying tactical nuclear weapons in forward locations (such as land-based systems in Belarus and Kaliningrad and sea-based systems on the ships of the Baltic fleet).<sup>32</sup> Sergei Kortunov, a member of the Russian security council and the deputy director of the Analytic Directorate of the President of the Russian Federation, recently warned that in the face of a mounting unfavorable balance in the correlation of forces, Russia might resolve to re-evaluate the 1991 unilateral tactical nuclear weapons initiatives.<sup>33</sup> Other Russian officials have also alluded to potential initiatives regarding tactical nuclear systems. Major General Belous has stated that “there is no doubt that in the present geopolitical situation a number of Russian TNW [theater nuclear weapons], particularly air-based ones, should be retained....” Belous regards tactical nuclear weapons as “the equalizer which would deprive NATO of its new-found military superiority.” He mentions the possibility that Russia may choose to “carry out a ‘demonstration’ TNW detonation to prove to an aggressor our resolve to use nuclear weapons,” and concludes that, “faced with an economic crisis and a rather modest ability to equip its army and navy, for the foreseeable future Russia will be forced to rely on nuclear weapons to ensure its security.”<sup>34</sup>

**Stockpile Consolidation and Stewardship Efforts.** Following President Gorbachev's unilateral weapons reduction initiatives in October 1991, the Soviet Union initiated a long-term consolidation and dismantlement program, engaging the entire spectrum of its nuclear weapons arsenal. While these efforts have, to some degree, reduced the concern about the security of Russian nuclear weapons, they have also, for the foreseeable future, increased the danger.

When the Soviet Union first initiated the process of weapons consolidation (mainly out of fear of the loss of control as the USSR was collapsing), tactical nuclear weapons were broadly dispersed across the empire. In fact, they were "scattered throughout at least nine or ten republics; were kept in hundreds of storage sites, a large number of which were adjacent to the operational forces that would use the weapons in the event of a conflict, came in a substantially wide variety of models; and not all varieties possessed safeguards."<sup>35</sup> Furthermore, the weapons were deployed among four different military organizations (the Red Army, the Soviet Navy, the air defense forces, and the air force); the Russian military owned nearly 15,000 tactical weapons, of which almost 6,500 were deployed outside of the Russian republic; and the system was not prepared for the rapid saturation that it experienced.<sup>36</sup>

Much to the credit of the General Staff and the Ministry of the Defense, the weapons were withdrawn from outlying regions rapidly—although not always under the safest of circumstances. Once consolidation efforts were underway, it rapidly became apparent that the Russian nuclear weapons storage and stewardship capacity was under serious stress, and was unable to handle safely the large number of weapons which were being withdrawn to the Russian Federation. Oleg Bukharin explains that, "although Russia is used to high rates of dismantlement, what is new is the mass relocation of tactical warheads from front-line units to central staging bases and assembly plants, unplanned increases in storage requirements for warheads and weapons components, economic crises,

and...the deteriorating security environment that may compromise safety and security."<sup>37</sup>

Credible studies reveal that storage capacities have been sharply reduced.<sup>38</sup> Before the collapse in 1991, the Soviet armed forces and the Ministry of Atomic Energy (MINATOM) had approximately ninety storage sites for nuclear weapons; forty-three of them were situated beyond the borders of the Russian Federation. In addition, three more army missile technical bases were evacuated from the North Caucasus military district after instability and turbulence broke out in that area. Consequently, the Russian Federation now operates only 38 storage facilities, three of them located at disassembly and refurbishment plants. According to knowledgeable experts, Russian nuclear weapons storage sites are currently operating at 167 percent capacity.<sup>39</sup> Security and safety measures are likely to suffer under such levels of overloading and stress on Russia's nuclear weapons management system.

While some Western officials have alleged that MINATOM has refabricated some of the weapons grade material into new warheads, this is difficult to prove or verify. However, it is well known that MINATOM and the Ministry of Defense have taken advantage of the unilateral initiatives and the consolidation process to rid themselves of old and obsolete weapons and warheads.<sup>40</sup> While the view that the Russians are dismantling between 2000 and 3000 warheads per year has been widely circulated,<sup>41</sup> this should be placed in perspective: (1) many of these weapons were scheduled for dismantlement anyway; (2) the actual dismantlement process is unverified and unobserved; (3) one cannot be sure that new warheads are not being designed and built; and (4) no mechanism exists to encourage accountability for the highly enriched uranium and plutonium that are obtained through the dismantlement process.

**Demoralized Personnel and Internal Security Problems.** Although problems related to nuclear weapons storage, transportation, dismantlement, and

refurbishment are severe, the potential impact from a fissured society and a disgruntled military is potentially even worse. In this sense, the overwhelming concern is that the Russian government, weakened as it is, no longer effectively controls its territory and its people. In the Soviet Union, the nuclear establishment had no need for extensive and technologically advanced barriers at its weapons storage facilities because of the government's rigid internal controls. “Back in the old days,” an official recently explained, “the lack of physical safeguards did not matter. Even if someone had shot off a lock [and seized military goods], the government would send the KGB after them. The basic assumption was that physical security was backed up by overall control [of society].”<sup>42</sup> The Soviet Union was never forced to develop a robust materials control and accountability system because “it had a pervasive central system regulating the movements of its citizens and monitoring suspicious activities.”<sup>43</sup>

Recently, several disturbing incidents involving nuclear weapons in the Russian Federation have been reported. “In one highly celebrated instance, inspectors from the Russian Ministry of Defense found a battery of nuclear-armed SS-25 mobile missiles completely deserted—all the operators and guards having left to search for food.”<sup>44</sup> In another incident, an enlisted man at an ICBM base in the Altai region went berserk in March 1994, killing two soldiers and seriously wounding another two. The local Strategic Rocket Forces commander initially tried to cover up the incident, but it leaked to the regional and then the national press. In a different case, a navy enlisted man took several sailors hostage on-board a Russian torpedo boat. Three of the hostages were killed before the attacker was subdued.<sup>45</sup> As John Lepingwell points out, “these dramatic incidents suggest that if crazed troops can create mayhem in high-security facilities, rather more sane criminals could perhaps wreak even more havoc.”<sup>46</sup>

Taken as a whole, there seems to be substantial opportunity for security breaches, theft, and system compromise in the nuclear weapons complex of the Russian Federation today. In addition, there is one certainty about the state of

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Russian nuclear weapons, both strategic and non-strategic, as well as the military personnel that operate these systems: the Russian Federation is convinced that, ultimately, its security rests upon these weapons, and it has therefore attempted to shield both the personnel and the hardware from the effects of the military rollback. In addition, because the Russian military planners not only appreciate the political deterrent value of nuclear weapons, but also have always been intrigued by their war-fighting applications, the Russian military and scientific elite continues to invest in their operational future.

### **A Possible Solution: An Air-Delivered Nuclear Forces Regime**

In September 1994, Deputy Secretary of Defense John Deutch chose to emphasize that “non-strategic nuclear forces remain one of the central problems we will be facing in managing our nuclear relationships during the coming years.” He went on to hint at a means to address the problem, saying that “not every initiative with the Russians has to be in the context of a post-START strategic nuclear agreement. There could be another kind of agreement which has to do with security of forces, including their controllability, which we think is so important; improving the pace at which they dismantle their nuclear weapons; it could have to do with *non-strategic* nuclear weapons.”<sup>47</sup>

The following regime presents a potential solution to the challenges created by non-strategic nuclear weapons. It posits an arms control regime beyond START I, START II, or even START III, based on the principles of reciprocity and transparency and on the control of weapons and warheads (instead of delivery systems). The emphasis on reciprocity and transparency is deliberate. An air-delivered nuclear forces (ANF) regime could only function in an environment where both sides could verify, to a high degree of certainty, that the other side was in compliance with the stated regime. This type of environment requires transparency—in other words, a new and heretofore unknown level of

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openness in mutual verification and inspection. This is likely to be a thorny issue, especially given the history of Russian hedging in this area.

The necessity for a new arms control initiative addressing this gray area is made even more urgent by: (1) the nature and extent of Russia's nuclear dilemmas, (2) the threat of premature nuclear use to save Russian conventional forces in a desperate position, (3) increasing concerns regarding the long-term threat of nuclear proliferation, (4) the efforts of NATO and the United States to raise the nuclear threshold, and (5) the unique and unprecedented alignment of geo-strategic forces in Eurasia. This is not to say that arms control and disarmament initiatives are a panacea capable of reliably providing regional and global security and stability in all circumstances. Arms control cannot exist outside the bounds of national security policy. Arms control and disarmament regimes are inherently political and involve wide-ranging efforts to create multilateral stability and transparency. They are "elements of national security policy [by] which nations seek to regulate their respective military forces through mutual agreement," but simultaneously, the political context surrounding arms control is not an agenda to be created, but an environment to be managed.<sup>48</sup> As Hedley Bull once noted, "it is a gross error, yet not an uncommon one, to believe that the military relations of nations exist in one compartment and their political relations in another, and that opposite tendencies can prevail in each compartment."<sup>49</sup>

Arms control for arms control's sake is therefore a misguided notion. "The effectiveness of arms control, like national military strategy, must be judged according to whether it increases security."<sup>50</sup> Furthermore, any agreements must shore up the long-term security of all participants involved. In the words of President Ronald Reagan, "we must seek agreements which are verifiable, equitable, and militarily significant. Agreements that provide only the appearance of arms control breed dangerous illusions."<sup>51</sup>

The ANF regime proposes a global limit on air-delivered nuclear

weapons—that is, any nuclear weapon delivered by any type of aircraft (the limit is on the weapons themselves, not the delivery systems). The focus is on air-delivered nuclear weapons because these systems, traditionally classified as “tactical,” “non-strategic” or “theater” weapons, actually can be seen as “strategic” or “pre-strategic” systems. In this sense, a gravity bomb or cruise missile that is delivered from a bomber or fighter-bomber from thousands of miles away (with limited warning) is a more offensive, deep-strike weapon than, for example, a lower yield nuclear shell fired from an artillery piece. The regime would engage the Russian Federation and the two NATO countries that are expected to retain air-delivered nuclear weapons—the United States and France. In general, it proposes to reduce and canton all weapons in declared sites. In subsequent stages, the numbers of weapons at each of the sites would be further reduced, and eventually all these air-deliverable weapons would be destroyed in mutually monitored facilities.

At this point, one may be tempted to ask—if tactical nuclear weapons are so dangerous, why limit only air-delivered weapons? The logic behind the narrow focus is two-pronged. First, air-delivered weapons are patently more offensive than any other type of tactical nuclear weapon. The other types—land mines, torpedoes, surface-to-air missiles, short-range missiles, and artillery rounds—are either purely defensive or of only limited offensive capability. Air delivered weapons combined with modern fighter or bomber aircraft and air-refueling abilities equate to a nearly unlimited range, providing the user country with a high-yield weapon that could strike from thousands of miles away deep into the heartland of the targeted country. Additionally, while not all-encompassing, an ANF regime represents an important first attempt at reducing an enormous category of weapons (engaging both sides in a more substantial arrangement than the 1991 unilateral and unverified pledges). Lessons learned in the process of dealing with air-delivered tactical nuclear weapons could be applied during future attempts to address the remaining weapons in this category.

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**Preconditions for Engagement.** While an in-depth discussion of the relative merits of specific proposals is beyond the scope of this article, it would be unwise not to acknowledge that before any fresh initiatives can go forward, all sides need to reach conclusions about several relevant and, in some cases, controversial policy issues. These include, but are not limited to, START I and II, a fissile materials cutoff agreement, and the development of significant transparency initiatives.

Although the ratification and full implementation of START II is probably not required for an ANF regime to be pursued, these developments would certainly be conducive to the overall acceptance of nuclear arms control within domestic political circles. Furthermore, it would make little sense to carefully limit and dispose of the excess highly-enriched uranium (HEU) and plutonium (Pu) resulting from dismantled warheads from an ANF agreement, if unrestricted and unchecked production of fissile materials were to continue. Most observers in Western nations agree that it is in their interest to halt the further production of materials that are already present in quantities far in excess of security needs (although both the Russians and the Chinese continue to produce fissile materials). Hence, a fissile materials cutoff is a reasonable prerequisite to implementing an ANF regime. Finally, although there are several transparency programs in place, the scope of these initiatives needs to be significantly expanded.<sup>52</sup> Recent efforts in this area have not proven very successful, owing in large part to Russian efforts to avoid implementing the May 1995 Yeltsin-Clinton agreement on stockpile transparency, as well as repeated Russian foot-dragging in transparency issues as a whole. Russian hedging in this area comes, to some degree, as a result of the continuing debate about the role of nuclear weapons as well as the perceived high utility of nuclear weapons generally. Current transparency programs, however, could serve as precursors to the more extensive programs that would be required for a workable ANF regime.

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On the other hand, one promising type of interaction is on the lab-to-lab level. Under the auspices of scientific and technological exchanges and joint problem-solving, individuals working directly for the national laboratories have often been able to achieve more in face to face contacts with their Russian colleagues in one afternoon than highly placed officials have been able to negotiate over several months. An example of this level of interaction is the exchange between Sandia National Laboratories and the Kurchatov Institute in Moscow, during which Sandia technicians helped to substantially upgrade the Institute's physical security arrangements and materials control and accounting procedures.<sup>53</sup> In a different case, the Institute for Experimental Physics in Arzamas-16 (MINATOM's counterpart to DOE's Los Alamos National Laboratory) and Los Alamos National Laboratory have begun to cooperate in the area of fissile materials control and accounting.<sup>54</sup> As Frank von Hippel, former Assistant Director for National Security in the Office of Science and Technology Policy, points out, "this 'lab-to-lab' program has taken off more quickly than the government-to-government approach, not surprisingly, because it empowers US and Russian technical experts to negotiate directly with each other...."<sup>55</sup> This type of interaction is productive and may lead to the level of transparency required to implement a warhead accounting and destruction agreement such as the proposed ANF regime.

**The Multi-Phased Approach.** Arms control can be described not only as an event, but as a process, involving years of tedious work and negotiations.<sup>56</sup> In a similar vein, the ANF regime would not be an event, but a long-term and multi-staged process. It would require the gradual establishment of a receptive environment in the highest levels of Russian and Western governments, since officials would probably be unwilling to move quickly with an unexplored or immature proposal. Therefore, an environment that is built upon long-term and positive interactions between scientists, scholars, and non-governmental

organizations would be likely to yield the basis for higher levels of confidence.

The ANF regime would be divided into several stages and spread out over a long-term implementation span, as shown in Table 1:

<b>Table 1: ANF Regime Implementation</b>	
<b>Stage One - Initial Agreement</b>	
1.	Declaration of facilities/cantonment sites
2.	Declaration of weapons numbers
3.	Verification Protocol
4.	Asymmetric Reductions to Equal Numbers
<b>Stage Two - Deep Reduction and Elimination Agreement</b>	
1.	Further Deep Reductions to Lower Thresholds
2.	Category Elimination
<b>Stage Three - Linkage to Further Warhead Destruction</b>	

Stage One is designed to facilitate the initial ANF Agreement.

Undoubtedly there would be problems on both sides with regard to internationally intrusive inspections because of the sensitivity of the weapons and facilities.

There would, as well, be questions regarding the exchange of restricted nuclear data. The issue of verification of starting numbers would be a significant hurdle. Thus, Stage One would need to resolve these initial issues and establish the trust and confidence required to implement the ANF regime.

First, the number of cantonment sites would be declared during negotiations. For the United States, one of the principal concerns would be the perspectives of its NATO allies, because US weapons in Europe would fall under the treaty regime. The United States would probably want to retain several cantonment sites in NATO Europe. For the Russian Federation, one of the

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principal concerns would be to retain weapons in places where they could be postured against the troubled strategic areas to the south and south-east.

Second, the numbers of weapons would be declared and the current arsenal would have to be secured. Although this should not be a problem for the United States, many complications must be anticipated on the Russian side at this stage. The weapons, many of which are not under the most satisfactory security and management programs, must be inventoried, centrally monitored, and stored under unimpeachable security conditions. If one cannot establish a leak-proof system at this point, further effort is not likely to overcome the dangers of nuclear theft, diversion, and proliferation, to say nothing of possible cheating. Therefore it is imperative to accomplish this step at an early point.

Third, a Verification Protocol would have to be negotiated. This agreement would cover the following areas: (1) agreement on the types of national technical means or on-site inspections to be used for verification of the cantonment sites and the weapons and warhead destruction process, (2) an agreed-upon cycle of routine on-site surety inspections at declared cantonment sites, and (3) a system for conducting no-notice challenge inspections.

Finally, the initial ANF agreement would involve actual weapons reductions. The US and Russian stockpiles would be reduced to equal numbers at a level slightly lower than the current global US inventory.<sup>57</sup> This anticipates a large, asymmetric Russian drawdown along with a smaller US reduction. Although this is an unbalanced process, there is ample precedent for it. During the INF treaty implementation, for example, the Soviet Union was required to engage in large, asymmetric reductions in its deployed missile forces. The remaining weapons would be placed in the declared cantonment sites.

Several issues must be taken into account during this stage:

- Once the weapons are moved to their cantonment areas, they must not be co-located with their respective delivery systems.

- The weapons would be monitored (but not controlled) at their cantonment sites (i.e., while monitoring systems would be installed to confirm treaty compliance, they would not prevent the individual countries from accessing the sites).
- As the weapons and warheads are reduced and destroyed, the destruction process would be a jointly verified procedure.
- The remaining fissile material would, in the case of HEU, either be diluted and committed to civilian nuclear reactor power programs, or be diluted and permanently disposed of after it has been mixed with other radioactive waste. The plutonium would also be permanently disposed of. These processes would be monitored by an internationally sanctioned agency such as the International Atomic Energy Agency (IAEA).

Whether the ANF regime as a whole could be fully implemented would depend on the level of success in carrying out the initial agreement in Stage One. This initial agreement might contain an obligation to seek a linkage to Stage Two, (e.g., further deep reductions and eventual category elimination, pending verifiable implementation of Stage One).

The initial part of Stage Two would entail further and deeper reductions of the weapons systems in addition to possible reductions in the number of cantonment sites. The final removal of US nuclear weapons from Europe would occur during the second part of Stage Two, when all weapons in this category (i.e., all air-delivered nuclear weapons) would be targeted for elimination. During this final phase, France's air-delivered nuclear weapons would also be eliminated along with those of Russia and the United States. In this manner, NATO would retain instruments of US nuclear protection in Europe until all Russian air-delivered nuclear weapons (especially those assigned to the Russian Long-Range Bomber divisions which could strike Europe with less warning time) have been withdrawn.

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Stage Three might come into being as an extension of the ANF regime. Aside from the nuclear warheads addressed by the ANF regime, thousands of other nuclear warheads have been retained under both the START and INF regimes. These weapons could also be targeted for eventual destruction based on the experience gained from implementing the ANF regime.

**Technical Hurdles: Verification, Detection, and Numbers.** It is reasonable to expect a series of challenges and hurdles if this regime were implemented. Three broad questions must be addressed. First, how would the verified elimination of nuclear warheads occur? Second, could the verification process detect nuclear weapons that may be hidden from the agreement? Third, how would the initial base-line number of warheads be determined?

*The verified elimination of nuclear warheads.*<sup>58</sup> The process of conducting the verified elimination of nuclear warheads would be complex and involved, but not insurmountable. Its principal focus is “to verify that warheads specified by [the] treaty for elimination are, in fact, completely dismantled, their components rendered useless for construction of new warheads, and the contained fissile materials placed under international safeguards or disposed of in such a manner as to make them unusable in weapons.”<sup>59</sup>

Each step in the process of eliminating warheads must be completely verifiable and has to ensure that (1) all warheads and associated payload hardware identified by the owner country and earmarked for elimination are in fact correctly described; (2) all items earmarked for elimination are destroyed, and (3) none of the nuclear material from the dismantled warheads is diverted to unauthorized uses. “These guarantees must be provided without the need to disclose sensitive information about the design of the warheads or other associated equipment, such as re-entry vehicles, penetration aids, or shielding against radiation.”<sup>60</sup>

Although it will be complex and arduous, the most crucial benefit of this

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process is that warhead dismantlement and elimination are not only verifiable, but the regime can also be designed to be resistant to tampering and cheating.

Moreover, if one assumes with Taylor that the dismantlement facility employs a “full-time work force of 100 direct labor employees, at \$100,000 per person-year (including overhead),” the labor costs would amount to \$10 million per year. In sum, “it is therefore unlikely that the total costs of dismantling...nuclear warheads, and providing the contained fissile materials for use as nuclear fuel or for direct disposal would exceed a few billion dollars.”<sup>61</sup>

*Detecting Nuclear Warheads.*<sup>62</sup> While it is possible to design a system for the verified destruction of nuclear warheads, the ANF treaty regime should also provide for a mechanism to detect behavior that violates the treaty boundaries (e.g., the withholding and hiding of nuclear warheads). This capability is more technologically complex, but is presently being developed in the United States. What follows is a brief summary of the methods currently being designed to provide this capability.

Steve Fetter has written that

Fissile materials [HEU and Pu] are radioactive; they are very dense and absorb certain radiation very well; and they can be fissioned. Therefore, there are three basic ways to detect fissile material: ‘passive’ detection of the radiation emitted by its radioactive decay, or ‘active’ detection involving either radio-graphing (‘x-raying’) an object to detect dense and absorbing materials, or irradiating an object with neutrons or high-energy photons and detecting the particles emitted by the resulting induced fissions.”<sup>63</sup>

The wide-area tracking system (WATS) concept, under development at Lawrence Livermore National Laboratory, incorporates multiple passive detectors in a sensor network, and can provide detection, some characterization, and monitoring/tracking of nuclear-weapon material for treaty verification.<sup>64</sup> Essentially, WATS incorporates a series of systems that provide for “continuous monitoring of nuclear-material diversion attempts.” Most significantly, WATS

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does not employ intrusive monitoring of only known and declared facilities; instead, “it provides comprehensive oversight of all facilities in the monitored area, even unknown sites.”<sup>65</sup> According to an expert familiar with the system’s capabilities, this feature “significantly mitigates the material source term initialization problem—the inability to confidently know the initial location of all material subject to monitoring.” WATS will incorporate “an easily deployed array of fixed sensors that can be supplemented with moving sensors that can be tailored to a specific need. By correlating the output of many sensors, the [WATS] system is capable of achieving much higher probability of detection and lower false alarm rates than are obtainable with individual sensors.”<sup>66</sup>

Thus WATS provides comprehensive oversight by detecting the presence and movement of nuclear-weapon materials without on-site presence—it is non-intrusive and does not require access to facilities. In other words, the ability to detect and locate the presence of materials that violate an ANF treaty regime within a monitored area is currently being developed by the national laboratories. This, along with other measures, should reduce the incentives to cheat and evade the treaty boundaries, and allow for the creation of a robust and comprehensive verification regime.

*The Original Base-Line Warhead Number.* One of the most basic potential obstacles within the ANF regime is the question of how many warheads each side really has. While at first this seems to be quite a significant challenge, in reality it may not be an insurmountable one. Both sides would declare the base-line numbers early in Stage One. Essentially, the inventories of weapons should be mutually declared and transparent. Following this exchange, the regime would incorporate a base-line inspection timeline, during which all parties could arrange for standard confidence inspections according to agreed-upon protocols. At the conclusion of Stage One all cantonment facilities must be declared and all warheads located within these facilities. Therefore, any warheads outside these boundaries would be in violation of the treaty regime. At this point, each party

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could initiate a series of challenge inspections, during which time all suspect sites would be subject to an on-site review within twenty-four hours of the request. In addition to this procedure, each party would be able to rely on national technical means (such as wide-area nuclear detection systems) in order to further enhance confidence in the reliability of the regime. Therefore, under the circumstances, it would be fairly difficult to successfully evade the treaty restrictions.

**Political Challenges: France.** Although the ANF regime would deal primarily with US and Russian air-delivered nuclear weapons, France's non-participation would leave it as the sole state possessing these weapons in Europe. The Russian Federation would therefore probably not agree to the regime unless French air-delivered nuclear weapons were incorporated.

The French approach to arms control has traditionally reflected the importance of nuclear weapons as France's ultimate guarantee of security as well as political and strategic autonomy in an uncertain and unstable world.<sup>67</sup> President Jacques Chirac reaffirmed his confidence in France's current posture in September 1995 when he stated, "Our present force is enough of a deterrent, it's in sufficient working order to take us up to the year 2010."<sup>68</sup> Historically France has declined to participate in nuclear disarmament negotiations such as SALT and START by arguing that these efforts should be pursued first by the superpowers. In 1983 François Mitterrand specified three requirements that must be satisfied before France could consider playing a role in such efforts:

- The reduction of the superpower nuclear arsenals to levels much closer to those of other nuclear powers.
- Limitations on defensive systems capable of neutralizing offensive deterrent forces (such as antimissile, antisubmarine, and anti-satellite weaponry).
- Significant progress in the reduction of the conventional force imbalances in Europe and the global elimination of chemical and biological weapons.<sup>69</sup>

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Historically both France and the United States have rejected attempts by Moscow to count French nuclear weapons with US totals (in the SALT and INF negotiations, for example).

More recently, French experts have indicated that France does not expect to engage in nuclear arms control efforts (other than deliberations related to the Nuclear Nonproliferation Treaty, the Comprehensive Test Ban Treaty, and the fissile material cutoff discussions) in the foreseeable future due to enduring differences in the force levels of France, the United States, and Russia.<sup>70</sup> However, in his comments on the 1994 French Defense *White Paper*, Prime Minister Edouard Balladur acknowledged that the country's nuclear deterrent should be "constantly adapted to the evolution of threats."<sup>71</sup> Recent unilateral cuts in France's nuclear forces reflect, among other things, the reduction in the threat as well as the impact of fiscal constraints.

Despite these policies, France might consider participating in the ANF regime if it believed its security would be enhanced by the elimination of a class of Russian nuclear weapons postured primarily against Europe. The reduction of US and Russian nuclear arsenals would help to redress long-standing French concerns regarding numerical imbalances. Additionally, the opportunity to reduce the defense budget might be welcomed in these times of fiscal austerity. Finally, the regime might be attractive to French political elites since it would promise France a genuine "seat at the table" on a par with the United States and Russia regarding a high-profile security issue. Notwithstanding these considerations, it seems likely that France would only participate if it believed that the ANF regime served its vital national security interests.

**Legal Obstacles: The START Treaties.** START I and II provide for different sets of constraints on heavy bombers and air-delivered nuclear weapons.<sup>72</sup> The ANF regime would significantly modify these constraints while

retaining all other elements of the START treaties. Currently, the US Air Force must hold its B-2 bombers in reserve for the nuclear missions and is therefore unable to take full advantage of the aircraft's conventional capabilities. In addition, as the B-52 fleet continues to grow older and a significant number are also held in reserve for nuclear roles, fewer aircraft are available for conventional scenarios (e.g., Desert Storm). Essentially, the ANF Regime would allow the USAF to release these aircraft from their nuclear taskings because the ANF regime would ultimately supersede all START restrictions on heavy bombers, freeing these delivery systems for conventional missions.

It should be noted that the 1994 Nuclear Posture Review concluded that 20 B-2s and 66 B-52s assigned to nuclear missions would serve as the heavy bomber leg of the nuclear triad for the foreseeable future. The nuclear warheads assigned to these aircraft would eventually be eliminated under an ANF regime, thus confining the mission of strategic deterrence to ICBMs and SLBMs. The ANF regime would not affect START ceilings on ICBMs and SLBMs. However, it might change the composition of the strategic nuclear force since the warhead numbers initially reserved for air-delivered nuclear weapons would no longer count against the accountable warhead ceilings. The changes to the strategic triad (i.e., the removal of the bomber leg) would require extensive deliberations involving numerous government agencies and the executive and legislative branches. While the outcome of such a process cannot be forecast, it represents a significant potential obstacle to the realization of an ANF regime.

**Russian Motives and the 1991 Initiative.** Many officials and experts would question whether the Russian Federation would ever be a willing participant in an ANF regime. For example, a July Russian 1996 report states that under the conditions of economic crisis and its fairly modest capabilities to equip the army and navy with new weapons, Russia will have to rely on nuclear weapons to safeguard its security in the foreseeable future... Because of Russia's

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geostrategic position, tactical nuclear weapons are of much greater military-political significance to Russia than to the United States.... That is why Russia can hardly expect the composition of its tactical nuclear weapons to be symmetrical with the US composition.”<sup>73</sup>

Given Russia's current conventional weakness and corresponding reliance on nuclear weapons for its security, it will require adroit persuasion to secure its participation in such a regime. Furthermore, Russia would have to accept large and asymmetric reductions in its nuclear forces.

Russian officials may seek tradeoffs in other areas—e.g., stopping or slowing the process of NATO enlargement, economic benefits, cutbacks in US SLBMs and SLCMs, or an adjustment or change to CFE or START II. In addressing these issues, the following should be considered. First, there are historical precedents for asymmetric weapons reductions (e.g., the INF and CFE treaties). Second, as stated earlier, the ANF regime should not be offered to Russia as a bargaining chip in conjunction with NATO enlargement (the regime could proceed in a “separate but parallel” mode). Third, NATO and the United States should insist that the ANF regime (including its focus on warhead reduction and elimination) be implemented as a testbed agreement before any other arms control treaties are modified.

While these are all potential complications, some experts might be surprised to learn that the USSR came close to proposing an arms control treaty regulating, among other systems, air-delivered nuclear weapons in late 1990 and early 1991.<sup>74</sup> In fact, according to Nikolai Sokov, the only reason that the initiative was not pursued was that President Bush's 1991 unilateral initiative preempted the Soviet proposal. The Soviet concept, devised by members of the Foreign Ministry's Department of Arms Control and Disarmament and agreed to by the General Staff, advocated a “leap forward” toward the reduction of warheads instead of delivery systems. The first stage of the proposal involved asymmetric Soviet reductions down to an equal level below the level of either side

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at the time. Following stages were designed to further reduce, and eventually eliminate, all theater weapons. The proposal envisioned concentrating the warheads at designated facilities with portal and perimeter monitoring systems as well as on-site inspectors. In order to increase confidence in the proposal, both base-line and challenge inspections were incorporated. The warheads were to be destroyed at jointly-monitored facilities. While foreign inspectors would not have been allowed to observe actual warhead dismantlement, all fissile materials were to be accounted for and all other components were to be destroyed in the presence of inspectors. The Soviet proposal suggested several layers of intrusive and non-intrusive inspection and detection systems that would ensure that a warhead would be detected even if it was initially missed or not accounted for. The projected Soviet initiative envisaged the eventual establishment of a nuclear-free zone in the center of Europe and over 1,000 km wide (stretching roughly from the Atlantic to the Urals). In other words, the Soviet proposal would have denuclearized all of Europe, including the European USSR. This zone would have “prevented” the use of tactical nuclear weapons in the case of an armed conflict.

In the 1991 Soviet proposal theater weapons were defined to include all ground-based systems (such as nuclear artillery, land mines, etc.) as well as all theater aviation assets. Significantly, however, the projected Soviet proposal did not include Long Range Aviation assets, and thereby preserved the USSR’s ability to strike at Central and Western Europe, even from beyond the Urals. One of the key differences between the Soviet proposal and the ANF regime is that the ANF regime would limit all air-delivered nuclear weapons.

It is critical to note that the projected Soviet proposal, if carried out, would have achieved a long-standing Soviet objective, namely the removal of US nuclear weapons from Europe. Simultaneously, it would have preserved the Soviet capability to use LRA forces against NATO

Europe. Surprisingly, however, the projected Soviet proposal does not seem to have addressed British and French nuclear forces. This is not likely to be the case in any future regime. Although the British will no longer deploy air-delivered weapons by 1998, the French intend to retain this capability for the foreseeable future.

The proposal nonetheless provided for an unusual level of transparency, and the Foreign Ministry was prepared to make a formal approach. Indeed, according to Sokov, the negotiating teams had already been assembled and the personnel assignments completed. Although the motives for such a proposal also involved the removal of NATO's European-based US nuclear deterrent forces, the terms of the proposal suggest an openness on the part of Russian policy makers to an exceptional degree of transparency. The fact that the proposal envisioned the limitation, reduction, and verified destruction of nuclear warheads is surprising, given the normally secretive and closed nature of the Russian and Soviet governments.

### **Conclusion: An ANF Regime and Atlantic Security**

The present global alignment of nuclear weapons between East and West is increasingly being supplanted by a new multi-polar dynamic. The uncertainty of this dynamic does not allow for an immediate reduction and withdrawal of all US nuclear weapons in Europe. In the words of Laurence Martin, "even in Europe this is not the time to dismantle deterrence. Rather it is an opportunity to adjust it; make it less expensive, oppressive and intrusive; and retain it as the latent source of stability within which the NATO powers can recast their relationships and Europe as a whole build a new, continental order."<sup>75</sup> While US nonstrategic nuclear forces still have a role in Europe today, their perceived value and utility are gradually fading, at least in the eyes of some observers. In fact, their final utility may be their role as a bargaining chip to induce the Russian

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Federation to eliminate entirely this category of weapons. It is in the security interests of the democracies of Europe and North America to address concerns regarding the nuclear weapons program of the Russian Federation.

How would the ANF Regime affect the health of nuclear deterrence for the United States and its NATO allies? One can certainly argue that the perceived value or validity of nuclear deterrence has been eroding since the collapse of the bipolar world order, both as a doctrine as well as a publicly articulated policy. The elimination of a major category of nuclear weapons in conjunction with the gradual withdrawal of remaining US nuclear forces in Europe would be consistent with this trend. The INF treaty and its zero-zero provisions are proof that NATO governments are capable of maintaining the credibility of their deterrent posture, even if the most capable European-based NATO nuclear weapons (i.e., those mounted on Pershing II and GLCM missiles) were completely eliminated.

Assessing the likelihood of a US nuclear response in the defense of its Allies should not be based on individual weapons systems, but rather on the stakes for US vital interests in maintaining and honoring Alliance commitments in Europe. The argument is not a new one; it has been discussed repeatedly since 1957, when *Sputnik* dramatized America's vulnerability to prompt Soviet nuclear retaliation in the event of US employment of nuclear weapons in defense of its Allies. For the remainder of the Cold War, the United States labored to assure its Allies that, vulnerability notwithstanding, US commitments to NATO Europe stood firm. Fortunately, the debate between vulnerabilities and enduring interests was never put to the test of nuclear war.

The ANF regime's impact on NATO cohesion is difficult to predict. It seems reasonable to assert that the formula describing US nuclear weapons as "the glue that binds the Alliance together" could erode along with the perceived credibility of nuclear deterrence. In other words, the value assigned to nuclear weapons as instruments for the preservation of alliance cohesion may be over-emphasized. Therefore, depending in part on the circumstances and associated

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Alliance policies, a gradual withdrawal of US nuclear weapons might not undermine Alliance cohesion. As Karl-Heinz Kamp and others have argued in the past, one possible result of such a withdrawal is that NATO would simply redefine its requirements for nuclear deterrence and thus preserve Alliance cohesion. Observers familiar with NATO nuclear planning indicate that such a withdrawal could be combined with a restructuring of the NATO nuclear consultation process that would link European security more clearly with US strategic nuclear forces. Intensified nuclear planning with nuclear and non-nuclear allies could be part of this process.

There can be little doubt that the ANF regime would curtail Russian air-delivered nuclear threats in the Eurasian area. While this regime neither recommends nor endorses the complete renunciation of nuclear deterrence, it does seek to promote raising the nuclear threshold and the containment of the threat of "loose" Russian nuclear weapons and fissile materials. In fact, the threat of Russian WMD probably does not reside in deliberately planned employment against NATO countries, as was the case during the Cold War. Rather, today's threat emanates from either (1) the loss of control over nuclear weapons systems or (2) the commitment of nuclear weapons in what is perceived to be a desperate situation in a conflict on Russia's periphery. Furthermore, the lack of modern permissive action links on these systems makes their control even more questionable. As Igor Khripunov explains, Russia's reliance on nuclear weapons with inadequate permissive action links increases "the likelihood of unauthorized or accidental launchings, as well as misinterpretations and disruptions in communications."<sup>76</sup>

The issue of whether the ANF regime would mitigate "new" WMD threats is less clear. Some might argue that lower numbers of US nuclear forces would entice others to play "catch up" with the United States and NATO in an effort to gain equal power and prestige. However, as Ivo Daalder points out, few countries could actually marshal the resources necessary to build up a nuclear

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force strong enough to challenge the nuclear posture of the United States. The United States and its NATO allies will in the foreseeable future have the ability to stay ahead of the few proliferants who may attempt this.<sup>77</sup> In any event, the perceived value for proliferants of possessing nuclear weapons and threatening their use, even with only one or two weapons, negates the parity argument, which was valid during the Cold War when NATO faced a multi-dimensional nuclear threat from the Soviet Union. After the late 1960s, US-Soviet nuclear parity was viewed as stabilizing because it undermined the incentives that higher numbers of weapons provided for a preemptive nuclear strike. Proliferants do not require nor aim for strategic parity. The possession of merely one or two weapons might, in some circumstances, credibly threaten NATO and the United States because of what is believed to be the completely different cost-benefit calculus of some proliferants. Thus, the ANF regime would probably not lessen the possibility of proliferant WMD threats.

Regarding proliferation by parties outside the Atlantic Alliance, Daalder writes, “a deliberate strategy to cut nuclear force levels can help to reduce the perception that nuclear weapons endow their possessors with power, prestige, and international stature—a perception that in itself contributes to proliferation.”<sup>78</sup> Daalder goes on to ask,

is it really in the US interest to advertise the centrality of nuclear weapons to power in international affairs at a time when countries like ... Japan and Brazil aspire to a greater role in, and responsibility for, preserving international security? Surely the United States has much to gain and very little to lose in arguing the opposite—that power and responsibility reside in the political and economic well-being of nations rather than in their nuclear status.<sup>79</sup>

Thus the perceived de-emphasis of nuclear weapons in the international sphere might provide an impetus for non-proliferation. On the other hand, proliferant states are not likely to define their national security strategies based simply on an ANF regime, and it is likely that they may find other factors more compelling—

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e.g., their own ambitions and perceived security needs. The drive to acquire nuclear weapons is not likely to decrease simply because the major powers have reduced their own nuclear weapons arsenals. Instead, the likelihood for nuclear proliferation will probably be driven by each state's specific security concerns.

If one accepts that the concept of extended deterrence remains valid, and that the US membership in the Atlantic Alliance continues to further American national security interests, then deterrence should remain robust under the terms of the ANF regime. "This would be true even if the US nuclear force levels continue to decline to still lower levels, provided that the nuclear capabilities potentially threatening to the allies (especially Russia) did so as well."<sup>80</sup>

Stationing American military personnel and nuclear weapons in Europe represented the US commitment and assured that stability would be maintained. The ANF regime would require first an asymmetric reduction, and then an equal and verified elimination of this category of weapons. If one accepts that nuclear weapons acquisition is driven primarily by a country's security concerns, then the ANF regime should lessen these concerns by introducing transparency, and by reducing and then eliminating these weapons. Unlike other arms control regimes, which have preserved Russia's ability to rapidly strike Western Europe with air-delivered nuclear weapons, this regime would reduce and ultimately eliminate this capability and would leave Russia with only strategic systems (ICBMs and SLBMs) and short-range tactical nuclear weapons to target Europe.<sup>81</sup>

The basic strategic stability between the United States and Russia (inherent in START I and II), as well as ongoing commitments by the United States to provide a nuclear umbrella for its NATO Allies and to further its political and economic interests throughout Europe would contain the risk of the Russians using variable-range ICBMs or SLBMs (or short-range tactical nuclear weapons) against NATO Europe. Nonetheless, one can anticipate that some European analysts and policy makers might prefer to retain a US nuclear presence in Europe, even if the successful implementation of an ANF regime would

eliminate all Russian air-delivered systems. This political factor would have to be addressed by the Alliance in pursuing an ANF regime.

In order to guarantee the long-term future security of the European area, NATO must be willing to change. The collapse of the Communist regime in Russia has altered the nuclear dynamic in that state. What once was a tightly controlled and strictly enforced nuclear archipelago is now a system under great strain, in which some Russians advocate greater operational reliance on nuclear weapons. As Graham Allison indicates, the dimensions of this threat will be perfectly clear the day after a catastrophe results from premature Russian nuclear employment or Russian nuclear leakage.<sup>82</sup>

Experts and officials alike believe that the chances of an intercontinental nuclear exchange are remote. However, the very weapons which all parties have sought to exclude from any mutually secured obligations are the same weapons that are perhaps the most likely to be used by the Russian Federation in a conflict, and are probably the most unsecure and mismanaged and, therefore, most likely to be the source of proliferation and leakage problems. A long-term ANF agreement would address these problems and simultaneously establish multiple fora for transparency and constructive engagement in the future. There are many good reasons why the United States should move toward a smaller nuclear force posture. As Daalder points out, "Although a residual need for deterrence will remain, the thrust of US policy toward nuclear weapons should now be to reduce the likelihood that nuclear weapons will ever be used."<sup>83</sup> This means reducing nuclear weapons in general, and Russian air-delivered nuclear weapons in particular.

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## ENDNOTES

<sup>1</sup> General Lee Butler, USAF (Retired), National Press Club Remarks, Wednesday, December 4, 1996, Washington, DC, p. 3.

<sup>2</sup> "Statement on Nuclear Weapons by International Generals and Admirals," Press Release, December 5, 1996, pp. 1-2.

<sup>3</sup> *Ibid.*, p. 2.

<sup>4</sup> The Natural Resources Defense Council estimates that Russia possesses some 18,000 tactical nuclear warheads, while the US possesses approximately 6,500. It should be noted that both numbers are only estimates. Information on tactical weapons is highly suspect, particularly in Russia.

<sup>5</sup> The NPR reaffirmed the nuclear triad (ICBMs, SLBMs, and manned bombers), and while it moved to establish US thresholds at START II levels, it advocated a "lead and hedge" strategy, preserving the capability to reconstitute warheads if deemed necessary.

<sup>6</sup> Article 5 of the North Atlantic Treaty, signed on 4 April 1949 in Washington DC, states the following: "The Parties agree that an armed attack against one or more of them in Europe or North America shall be considered an attack against them all; and consequently they agree that, if such an armed attack occurs, each of them...will assist the Party or Parties so attacked by taking forthwith, individually and in concert with the other Parties, such action as it deems necessary, including the use of armed force, to restore and maintain the security of the North Atlantic area." Cited from NATO Handbook, NATO Office of Information and Press, Brussels, 1995, p. 232.

<sup>7</sup> Bruce G. Blair, "Russian Control of Nuclear Weapons," in George Quester, ed., The Nuclear Challenges in Russia and the New States of Eurasia, (Armonk, NY: M.E. Sharpe, 1995), p. 61.

<sup>8</sup> Ivo H. Daalder, The Nature and Practice of Flexible Response NATO Strategy and Theater Nuclear Forces since 1967, (New York: Columbia University Press, 1991), p. 199.

<sup>9</sup> Of course, a primary motive for this move was to allay Russian concerns over NATO enlargement. Richard Beeston, "Russians Attack Yeltsin over NATO concessions," The Times, March 24, 1997, Internet edition.

<sup>10</sup> Konstantin Sorokin, "Russia after the Crisis: The Nuclear Strategy Debate," Orbis, Winter 1994, p. 25.

<sup>11</sup> The CIA document was reportedly leaked to the press by sources inside the agency. Bill Gertz, "Russian Renegades Pose Nuke Danger: CIA Says Arsenal Lacks Tight Controls," Washington Times, October 22, 1996, p. 1.

<sup>12</sup> For detailed analysis on the depth of this problem, see Graham Allison et al, Avoiding Nuclear Anarchy, CSIA Studies in International Security No. 12, (Cambridge: The MIT Press, 1996), and Quester, The Nuclear Challenges in Russia and the New States of Eurasia, 1995).

<sup>13</sup> See Vladimir Semenovich Belous, "Tactical Nuclear Weapons: A Half-Forgotten Reality." Segodnya, FBIS-TAC-95-014-L, 23 June 1995.

<sup>14</sup>For a thorough discussion of these issues, see Oleg Bukharin, "Nuclear Safeguards and Security in the Former Soviet Union." Survival, Winter 1994-95, p. 56.

<sup>15</sup> While most sources indicate that weapons and delivery systems are stored separately, there is no evidence that special procedures are undertaken to ensure separation and access denial between the troops that guard the weapons and those that operate the delivery systems.

<sup>16</sup> Oleg Bukharin, "Technical Aspects of Proliferation and Non-Proliferation," in Quester, The Nuclear Challenge in Russia and the New States of Eurasia, p. 46.

<sup>17</sup> Bukharin, "Nuclear Safeguards and Security in the Former Soviet Union," p. 62.

<sup>18</sup> Blair, "Russian Control of Nuclear Weapons," p. 47.

<sup>19</sup> Testimony by Dr. John Deutch before the US Senate, as reported in the Security Issues Digest, US NATO Wireless File, European Wireless File No. 52, Thursday, March 21, 1996, p. 9.

<sup>20</sup> Bukharin, "Nuclear Safeguards and Security in the Former Soviet Union," p. 61.

<sup>21</sup> The information regarding locks on gravity bombs and cruise missiles is drawn from Blair, "Russian Control of Nuclear Weapons," pp. 61 and 80.

<sup>22</sup> Ibid., p. 61.

<sup>23</sup> US Department of Defense, Nuclear Posture Review, September 1994.

<sup>24</sup> Steven Zaloga, "The CIS Nuclear Weapons Industry." Jane's Intelligence Review, Vol. 4, No. 9, September 1992.

<sup>25</sup> Blair, "Russian Control of Nuclear Weapons," p. 59.

<sup>26</sup> Ibid.

<sup>27</sup> Some Russian officials explain that while this is still necessary, it is neither desirable nor planned for a long-term posture. They indicate that due to the loss of warning and detection infrastructure (Ballistic Missile Early Warning Systems, missile tracking facilities, communication links, etc.) with the collapse of the former Soviet Union, the Russian capability to reliably detect a strategic strike is presently incomplete. Thus, for the time being, they have to opt for a less optimal posture until this deficiency can be adequately addressed.

<sup>28</sup> John R. Lepingwell, "Is START Stalling?" in The Nuclear Challenge in Russia and the New States of Eurasia, George Quester, ed., p. 108.

<sup>29</sup> The information is based on an interview conducted by the authors with Dr. Nikolai Sokov on August 9, 1996. Dr. Sokov is currently serving as a post-doctoral fellow at the Center for Nonproliferation Studies, Monterey Institute of International Studies. He is a member of the Russian Foreign Ministry (Department of Disarmament and Control of Military Technologies) and is currently on an extended leave of absence.

<sup>30</sup> Emphasis added. Igor Khripunov, "Russia's Dangerous Weakness," in Armed Forces Journal International, June 1996, p. 40.

<sup>31</sup> Bruce G. Blair, "Russian Realities and the Illusion of Arms Control." Lexis-Nexis (The Christian Science Monitor), September 19, 1995.

<sup>32</sup> Blair, "Russian Control of Nuclear Weapons," p. 61; "NATO Expansion Eastwards Could Threaten Denmark: Report," Agence France Presse, International News, Copenhagen, 17 March 1997 (Lexis-Nexis); and Andrei Smirnov, "Yeltsin May Sign Treaty with NATO on May 27," Russian Press Digest, 10 April 1997 (Lexis-Nexis).

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<sup>33</sup> "Press Conference with Officials of the Presidential Analytical Directorate Regarding Russia's National Security Policy." Lexis-Nexis (Federal Information Systems Corporation, Official Kremlin International News Broadcast), April 26, 1996.

<sup>34</sup> While Russian threats regarding the use of nuclear weapons in the face of NATO enlargement became prolific toward the end of 1995 and during the first half of 1996, many of those statements may have largely been political posturing leading up to the June 1996 Presidential elections. The statements above, however, do not represent this type of rhetoric. On the contrary, they are brought forth by seasoned strategists who are contemplating Russia's new conventional dilemmas. See Belous, "Tactical Nuclear Weapons: A Half-Forgotten Reality."

<sup>35</sup> Steven E. Miller, "Western Diplomacy and the Soviet Nuclear Legacy." Survival, Autumn 1992, p. 7.

<sup>36</sup> Ibid.

<sup>37</sup> Oleg Bukharin, "Stored Nuclear Warheads Could Become Unstable." Lexis-Nexis (Newspaper Publishing PLC; The Independent), February 22, 1994.

<sup>38</sup> The following estimates are obtained from a detailed report by Anton Surikov and Igor Sutyagin entitled "The Movement and Storage of Russian Nuclear Weapons." Jane's Intelligence Review, Vol. 6, No. 5, May 1994.

<sup>39</sup> Anton Surikov and Igor Sutyagin, "The Movement and Storage of Russian Nuclear Weapons," Jane's Intelligence Review, May 1994, p. 203.

<sup>40</sup> Allison, et al. pp. 180-181.

<sup>41</sup> Ibid., p. 190.

<sup>42</sup> Seymour M. Hersch, "The Wild East." The Atlantic Monthly, June 1994, p. 69.

<sup>43</sup> Frank von Hippel, "Fissile Material Security in the Post-Cold-War World." Physics Today, June 1995, p. 27.

<sup>44</sup> The SS-25 Topol, in addition to being currently Russia's premier land-based ICBM, is a strategic system; and strategic weapons are, according to accepted norms, the best protected and secured weapons in the Russian arsenal! Allison et al. p. 8.

<sup>45</sup> These two incidents are described in John Lepingwell's "Is START Stalling?" chapter in The Nuclear Challenge in Russia and the New States of Eurasia, pp. 102-03.

<sup>46</sup> Ibid., p. 103.

<sup>47</sup> Comments by John Deutch, Deputy Secretary of Defense, at the Nuclear Posture Review press conference, news release by the office of the Assistant Secretary of Defense for Public Affairs, September 22, 1994, pp. 5-6, 12-13.

<sup>48</sup> Schuyler Foerster et al., Defining Stability: Conventional Arms Control in a Changing Europe. (Boulder: Westview Press, 1989), p. 9.

<sup>49</sup> Hedley Bull cited in Foerster, Defining Stability, p. 9.

<sup>50</sup> Ibid., p. 45.

<sup>51</sup> President Ronald Reagan cited in Teena Mayars, Understanding Weapons and Arms Control. (Washington: Brassey's (US ), Inc., 1991), p. 23.

<sup>52</sup> The Cooperative Threat Reduction (CTR) program, under Nunn-Lugar funding (also known as the Safe and Secure Dismantlement Program, funded by DoD under a government-to-government agreement and administered by the Defense Special Weapons Agency), and the Exchange in the Fields of Nuclear Weapon Safety and Security (a government-to-government program signed under the auspices of the Gore-Chernomyrdin commission) are examples of such programs in place today. See the prepared statement of

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Albert Narath, Director of Sandia National Laboratories, before the US House of Representatives Committee on National Security, Subcommittee on Military Procurement, March 29, 1995.

<sup>53</sup> Frank von Hippel, "Fissile Material Security in the Post-Cold-War World," in Physics Today, Vol. 48, No. 6, June 1995, p. 28.

<sup>54</sup> Ibid.

<sup>55</sup> Ibid.

<sup>56</sup> Interview with Dr. Amy Sands, formerly a deputy director of the US Arms Control and Disarmament Agency, at the Monterey Institute for International Studies, Center for Non-Proliferation Studies, August 8, 1996. Dr. Sands attributes the slow rate of this process in part to the immense amount of staying power in government bureaucracies on both sides.

<sup>57</sup> While the French would be "at the table" from the outset, French reductions would occur only at the end of Stage Two. The French weapons, though not reduced, would be counted together with the US totals against the Russian ceilings. Also, in order to assuage European concerns, initial US reductions could come from weapons deployed in the CONUS and not from the current European-based US nonstrategic nuclear arsenal.

<sup>58</sup> The information presented here was drawn from Theodore B. Taylor's, "Verified Elimination of Nuclear Warheads" in Science and Global Security, Vol. 1, 1989.

<sup>59</sup> Ibid., p. 1.

<sup>60</sup> Ibid., p. 7.

<sup>61</sup> Ibid., p. 22.

<sup>62</sup> The information contained in this section is drawn from the following two sources: Steve Fetter, et al., "Detecting Nuclear Warheads," in Science and Global Security, Vol. 1, 1990, pp. 225-302; and Zachary Koenig, et al., "Wide-Area Nuclear Detection for Monitoring and Tracking Nuclear-Weapon Material" in Arms Control and Nonproliferation Technologies, Third Quarter 1994, pp. 27-28.

<sup>63</sup> Fetter et al., "Detecting Nuclear Warheads," p. 226.

<sup>64</sup> Koenig et al., "Wide-Area Nuclear Detection," p. 27.

<sup>65</sup> Ibid. Emphasis added.

<sup>66</sup> Ibid.

<sup>67</sup> David S. Yost, "Nuclear Debates in France," Survival, Winter 1994-95, p. 129.

<sup>68</sup> Text of televised interview provided by the French Embassy, Washington DC, "Interview with M. Jacques Chirac," 7 Sur 7, TF1, 18 September 1995, p. 9.

<sup>69</sup> Francois Mitterrand cited in David S. Yost, "France," in Douglas J. Murray and Paul R. Viotti, eds., The Defense Policies of Nations: A Comparative Study, third edition (Baltimore: The Johns Hopkins University Press, 1994), p. 266.

<sup>70</sup> Based on interviews with several French nuclear policy experts conducted in both Washington, DC, and Monterey, California, from February through June 1996.

<sup>71</sup> France. Ministry of Defense. Defense White Paper. 1994.

<sup>72</sup> For information on START I see "START: Basic Provisions of the Treaty," WEB Edition, Arms Control and Disarmament Agency, 21 May 1996. For information on START II, see "START II: Treaty Between the United States of America and the Russian Federation on Further Reductions and Limitations of Strategic Arms," The Nuclear Roundtable (Background Document), Internet Edition, The Henry Stimson Center.

<sup>73</sup> "Ratifikatsiya Dogovora SNV-2: Resheniya, Problemy, Perspektivy," Special Supplement to Obozrevatel-Observer, 19 July 1996.

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<sup>74</sup> The following information was obtained during an interview with Dr. Nikolai Sokov, Monterey Institute of International Studies, on August 16, 1996.

<sup>75</sup> Laurence Martin, "Dismantling Deterrence?" Review of International Studies, Vol. 17, 1991, p. 224.

<sup>76</sup> Khrpunov, "Russia's Dangerous Weakness," p. 43.

<sup>77</sup> Ivo Daalder, "What Vision for the Nuclear Future?" in Lexis-Nexis (The Washington Quarterly), Center for Strategic and International Studies and the Massachusetts Institute of Technology), Spring 1995.

<sup>78</sup> Ibid.

<sup>79</sup> Ibid.

<sup>80</sup> Daalder, The Nature and Practice of Flexible Response, pp. 8-9.

<sup>81</sup> Russia would retain the capability to regenerate nuclear artillery, short-range missiles, etc. However, the assumption is that an air-delivered nuclear weapon can be employed in a much more rapid and potent fashion than, for example, an artillery shell or short-range missile—unless, of course, the weapons target is immediately adjacent to its deployment site.

<sup>82</sup> Allison et al, p. 176.

<sup>83</sup> Daalder, "What Vision for the Nuclear Future?"

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